Inheritance of Time of Flowering in *Phaseolus vulgaris* L.

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The inheritance of time of flowering was studied in 3 *Phaseolus vulgaris* variety crosses involving early (E) x late (L) parents as follows: White Seeded Tendergreen (E) x Bush Blue Lake Oregon State University (OSU 949-1864) (L); Great Northern (G. N.) 1140 (E) x G. N. Nebraska #1 selection 27 (L) and White Seeded Tendergreen (E) x G. N. Nebraska #1 sel. 27 (4). In the cross White Seeded Tendergreen x Bush Blue Lake OSU 949-1864, time of flowering was determined primarily by one major gene, lateness being dominant to earliness. Dr. W. A. Frazier informed the authors that under Oregon conditions OSU 949-1864 actually blooms about the same time as White Seeded Tendergreen while under Nebraska conditions, OSU 949-1864 blooms about 15-20 days later than White Seeded Tendergreen. Perhaps this difference in time of flowering is due to different photoperiods. In the cross G. N. 1140 x Nebraska #1 Sel. 27, time of flowering was determined primarily by 2 major genes, earliness being dominant to lateness. In the cross White Seeded Tendergreen (day neutral) x G. N. Nebraska #1 Sel. 27 (long day) a third pattern of inheritance was noted. Dominance for late flowering was observed in the F_1. It is suggested that a late flowering plant must be homozygous dominant at the loci AA and BB regardless of the condition of the C locus or heterozygous at these loci in the presence of CC or Cc or homozygous dominant at one and heterozygous at the other of these loci in the presence of CC or Cc. These results were obtained when the plants were grown under long days in western Nebraska. In the greenhouse under short days in the fall Nebraska #1 Sel. 27 blooms a short period after White Seeded Tendergreen.

Component Interaction in Relation to Heterosis for Plant Height in *Phaseolus vulgaris* L., Variety Crosses

Dermot Coyne

Many complex traits in plants can be partitioned into 2 or more independent component parts or processes. For example, the components of plant height in beans are internode number and length. Several investigators have reported that the genetic basis of heterosis of a complex trait can be explained by the multiplicative interaction on the phenotypic level of the components of the trait. The interaction of the components of plant height was studied in the parents and F_1 of the crosses Yellow

Eye PI 209806 x G. N. Nebraska #1 and Dark Red Kidney x G. N. Nebraska #1. Dark Red Kidney has a determinate growth habit. PI 209806 and Nebraska #1 have an indeterminate growth habit. Heterosis for plant height was observed in the F_1 of both crosses. In the F_1 PI 209806 x Nebraska #1 complete phenotypic dominance for internode length and internode number was observed. Heterosis for this complex trait can be explained by the multiplicative interaction on the phenotypic level of the components of the trait. The F_1 Dark Red Kidney x Nebraska #1 showed heterosis for plant height and for one of the components internode number. The heterosis for the complex trait, plant height, is due to heterosis for one of the components of the trait. The Dark Red Kidney may have a genetic potential for high internode number which is suppressed by the gene for the determinate plant form. It is suggested that the observed heterosis for internode number in the F_1 be due not to overdominance ncr to genic interaction, but could possibly be due to genes for high internode number received from the Dark Red Kidney which are expressed in the presence of the dominant gene for indeterminate growth in the F_1.

A Genetic Study of "Crippled" Morphology Resembling Virus Symptoms in *Phaseolus vulgaris* L.

Dermot Coyne

Stunted plants possessing small crinkled leaves were observed in F_2 and F_3 populations derived from the *P. vulgaris* variety crosses, Yellow Eye PI 209806 x G. N. Nebraska #1 and Dark Red Kidney x G. N. Nebraska #1. The "crippled" plants observed by the author appear similar to the aberrant plants described in bean crosses by other authors (Davis, D. W. and W. A. Frazier, Ann. Reptr, Bean Improv. Coop. 7:14-16, 1964, and Frazier *et al.* Proc. Amer. Soc. Hort. Sci. 71:416-421). The "crippled" plants in this study simulate plants infected by a virus. Dr. W. B. Allington, Plant Path. Dept., Univ. of Nebraska, failed to find a virus in these plants. The occurrence of "cripple" plants in the F_2 and F_3 populations in both crosses indicated that some form of complementary gene action was involved. A good fit to a 15:1 ratio of normal to "crippled" was observed in the F_2 of both crosses (Table 1). The data suggest that the "cripple" character is determined by 2 complementary recessive genes.